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Case Study: Low Flow Measurement in a Small Channel Using Teledyne RDI's StreamPro ADCP with a Customer-Made Traveler System

Andrew Willsman at NIWA (National Institute of Water and Atmospheric Research Ltd., New Zealand) Dunedin office recently conducted a flow measurement with a Teledyne RDI's StreamPro using the low noise mode in a low velocity channel, 2.6m wide with a maximum depth of 0.3m (Figure 1). Flow measurement transects were made using Andrew's newly developed traveler system that can run a StreamPro float at variable speed (0.5cm/s to 10cm/s) with remote stop, start, and direction control.

The Traveler was set at a speed of ~1cm/s (Figure 2) to traverse the section in greater than 3 minutes. Slow and steady float speed and the StreamPro low noise mode generated high precision velocity data (Figure 3). The flow result of 37 l/s (Table 1) had a coefficient of variation of 2% which was very good compared to all prior measurements at this site with the Streampro which typically varied by +/- 10% from the mean flow result.

For detailed information on the case study and the Traveler system, please contact Andrew Willsman or John Fenwick by Email:a.willsman@niwa.co.nz or j.fenwick@niwa.co.nz.

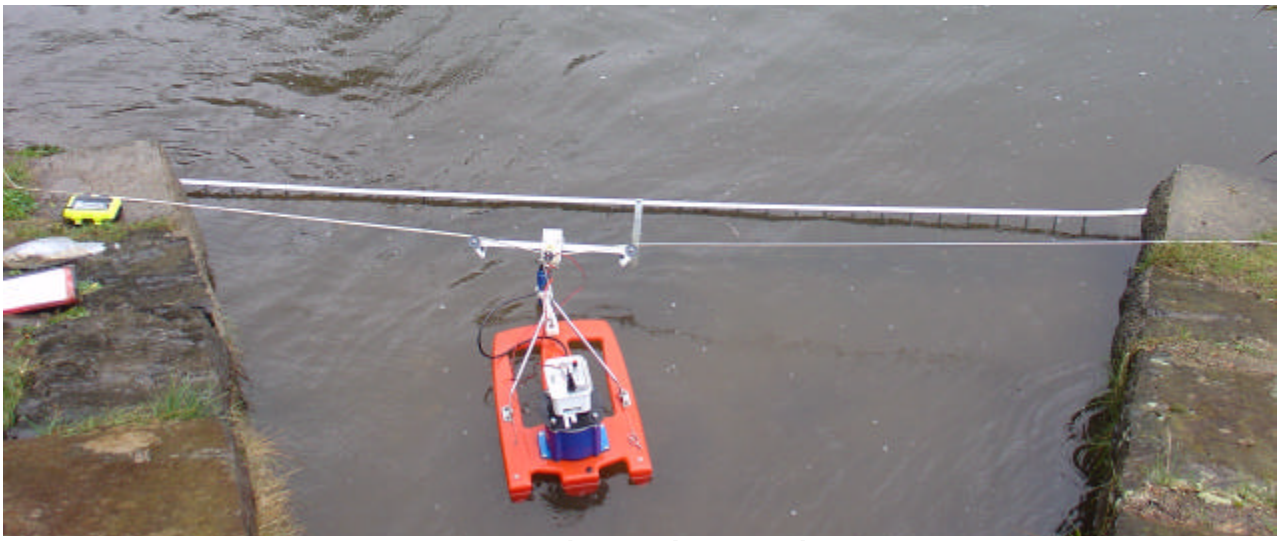

Figure 1 StreamPro with a Traveler system during a transect

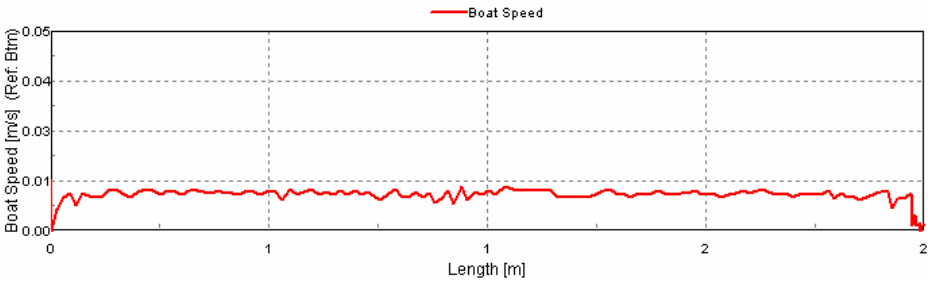

Figure 2: Float speed plot from a traverse of the small channel. Very slow and steady travel speed was achieved by the Travel system, which ensures the high quality flow measurements in such small channel

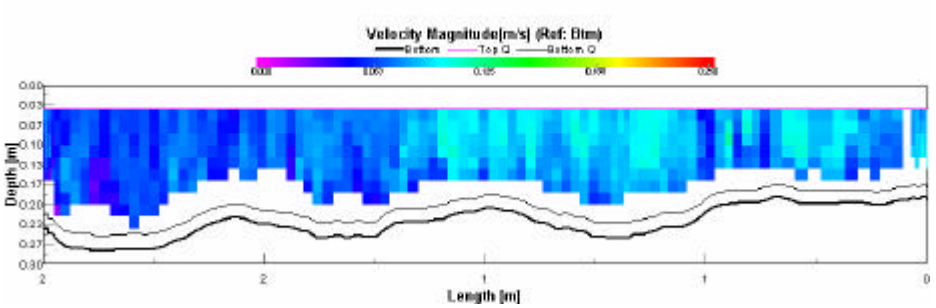

Figure 3: A velocity magnitude plot. Slow and steady float speed and the StreamPro low noise mode generated high precision velocity data

Table 1: Flow results from 9 traverses of the small channel

Traverse No.	Total Q [m³/s]	Total Area [m²]	Width [m]	Boat Speed [m/s]	Flow Speed [m/s]	Duration [s]
1	**0.037**	0.55	2.6	0.008	0.072	**308**
2	**0.036**	0.57	2.68	0.011	0.067	**210**
3	**0.036**	0.57	2.66	0.013	0.069	**188**
4	**0.037**	0.55	2.62	0.01	0.072	**226**
5	**0.036**	0.56	2.65	0.009	0.069	**292**
6	**0.038**	0.59	2.76	0.008	0.068	**326**
7	**0.036**	0.56	2.66	0.008	0.068	**300**
8	**0.036**	0.56	2.68	0.008	0.068	**312**
9	**0.037**	0.55	2.61	0.008	0.07	**302**
Average	**0.037**	**0.56**	**2.66**	**0.009**	**0.069**	
Std. Dev.	0.001	0.01	0.05	0.002	0.002	
Std./| Avg.|	**0.02**	**0.02**	**0.02**	**0.2**	**0.03**	